

REMARKS

Claims 1-5 and 9-11 stand rejected under 35 U.S.C. §112, first paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. Applicants respectfully traverse this rejection.

The Examiner alleged that the originally filed Specification did not contain the following portion of independent Claim 1:

wherein the adjustment of the phase relationship is carried out for the purpose of eliminating phase difference of a signal disposed at a different position in the data driving part.

In response, the Examiner's attention is directed to page 39, lines 15-31, of the Specification as originally filed, which states:

... Thereby, the phase relationship between the clock signal CLK and the data signal DATA is controlled to be the same as that of the liquid crystal driving circuit M1a shown in FIG. 29(a).

Thus, according to the second embodiment of the present invention, as the phase difference of the data signal DATA supplied to the liquid crystal driving circuit M1a through M10a disposed at different positions with respect to the clock signal CLK can be eliminated in each of the liquid crystal driving circuits M1a through M10a, the data signal DATA can thus be latched at the same timing, and desired setup time and desired hold time can be obtained there. Thereby, an image produced according to this data signal DATA can be positively displayed on the display part 6. (emphasis added)

In other words, this portion of the Specification states that the phase relationship is adjusted (“controlled”) to eliminate the phase difference between signals disposed at different positions of the data driving part (such as data driving circuits M1a through M10a of Figure 21, which are shown to be disposed in different positions). Additionally, the specifics of several examples of how the adjustment of the phase relationship defined in Claim 1 can be accomplished is described in the original Specification on, for example, page 32, line 8, through page 39, line 19. Accordingly, as Applicants have shown that the subject matter of Claim 1 is adequately described in the original Specification, Applicants respectfully request the withdrawal of this §112, first paragraph, rejection of independent Claim 1 and associated dependent Claims 2-5.

The Examiner also alleged that the originally filed Specification did not contain the following portion of independent Claim 9:

wherein the timing correcting part makes the clock signal and image display signal supplied by the control part have a predetermined phase relationship therebetween to eliminate a phase difference of a signal disposed at a different position in the data driving part.

In response, the Examiner’s attention is directed to page 39, lines 20-31, as quoted above, as well as to page 44, lines 9-15, of the Specification as originally filed, which states:

Moreover, by making equal the setup time and hold time among the plurality of data driving parts, as a result of the clock signal and image display relationship being made to have a predetermined phase relationship without regard

to the disposed position of each data driving part,
reliable picture display is realizable. (emphasis
added)

The Examiner also stated that the Specification fails to provide support for the clock signal and the image display signal being supplied by the control part. In response, the Examiner's attention is directed to page 32, lines 8-16, which states:

The liquid crystal display in the second embodiment includes the liquid crystal driving circuits M1a through M10a to which different delay times according to the disposed positions thereof are previously set in order to eliminate the timing error resulting from the delay produced when the clock signal is transmitted to the respective liquid crystal driving circuits M1a through M10a from the timing controller 72. (emphasis added)

Thus, this passage of the original Specification clearly discloses that, in this embodiment, the clock signal is supplied by the control part (timing controller 72). With regard to the image display signal also being supplied from the control part, the Examiner's attention is directed to page 31, line 35, through page 32, line 7, which disclose that the circuit of Figure 21 of the second embodiment is similar to the circuit of Figure 1, and the Examiner's attention is also directed to page 1, lines 28-35, which disclose that in the circuit of Figure 1, image data is transmitted from timing controller 2. Thus, this feature is also disclosed in the originally filed Specification.

Thus, in light of preceding discussion, Applicants submit that it has been shown that the subject matter of independent Claim 9 is adequately described in the original Specification. Accordingly, Applicants respectfully request the withdrawal of this §112, first paragraph, rejection of independent Claim 9 and associated dependent Claims 10 and 11.

Claims 1-5 and 9-11 stand rejected under 35 U.S.C. §103 as being unpatentable over United States Patent No. 6,144,355 to Murata et al. in view of United States Patent No. 4,713,691 to Tanaka et al. Applicants respectfully traverse this rejection.

Applicants maintain and incorporate by reference herein those arguments previously advanced on pages 7 through 9 of Amendment B filed on August 23, 2005. Applicants respectfully request that the Examiner reconsider those arguments, and withdraw this §103 rejection. Additionally, Applicants respectfully request that the Examiner consider the following arguments, which were originally presented in Response C (filed April 12, 2006), and to which the Examiner has not provided any counter-arguments. Instead, in the “Response to Arguments” section of the July 12, 2006 Final Office Action, the Examiner merely responded to Applicants’ arguments regarding the §112 rejection, and not the §103 rejection. Accordingly, Applicants respectfully request that the Examiner consider and respond to the following arguments.

Applicants respectfully submit that even assuming *arguendo* that the Tanaka et al. reference could be combined with the Murata et al. reference, the resulting device would still not include all of the features of the present invention. More specifically, neither the Murata et al. reference nor the Tanaka et al. reference disclose or suggest a liquid crystal

display in which, *inter alia*, the adjustment of the phase relationship is carried out for the purpose of eliminating phase difference of a signal disposed at a different position in the data driving part, as recited in independent Claim 1. Similarly, neither of the cited references disclose or suggest a liquid crystal display in which, *inter alia*, the timing correcting part makes the clock signal and image display signal supplied by the control part have a predetermined phase relationship therebetween to eliminate a phase difference of a signal disposed at a different position in the data driving part, as defined in independent Claim 9.

Applicants respectfully submit that neither Murata et al. nor Tanaka et al. disclose or suggest anything about eliminating the phase difference between signals disposed at different positions of the data driving part (i.e., with different wiring lengths). As correctly acknowledged by the Examiner, the Murata et al. reference does not disclose adjusting the phase relationship between the clock signal and the image display data. Accordingly, the Examiner relied upon the Tanaka et al. reference for this feature. However, as discussed below, the Tanaka et al. reference also fails to disclose or suggest adjusting the phase relationship to eliminate the phase difference of signals disposed at different positions in the data driving part, as recited in independent Claims 1 and 9.

One of the problems solved by the present invention relates to eliminating the phase difference due to signal delays caused by different wiring lengths, as described in the original Specification on, for example, page 1 (line 18) through page 4 (line 26). More specifically, with the increased wiring lengths when comparing the driving circuits M1

through M10 to each other, there are delays caused in the clock signal (CLK), as can be seen when comparing Figures 2A, 2B and 2C. More specifically, since Figure 2B relates to driving circuit M5 (which has a longer wire than circuit M1, as can be inferred from Figure 1), there is a delay D1 caused in the clock signal (CLK) when compared to Figure 2A, which relates to driving circuit M1. Further, Figure 2C shows an even greater delay D2 because driving circuit M10 includes an even greater length of wire than either M1 or M5. Such delays due to the increased wiring lengths to the different driving circuit parts (M1-M10) undesirably cause the setup time (ST) to be larger and the hold time (HT) to be shorter for driving circuit parts further from the timing controller than for those driving circuit parts closer to the timing controller. One of the objects of the present invention is to solve this problem by eliminating the phase difference due to signal delays caused by different wiring lengths.

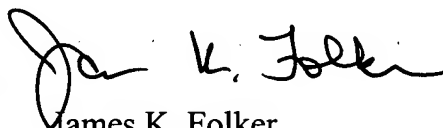
In contrast, the Tanaka et al. reference fails to disclose or suggest eliminating the phase difference caused by different wiring lengths, i.e., “eliminating phase difference of a signal disposed at different position in the data driving part,” as defined in independent Claims 1 and 9. Although the Tanaka et al. reference does include applying a delay time to a clock signal, the delay time selected is not based on different positions of data driving parts. In fact, the Tanaka et al. reference fails to even mention data driving parts at different positions, or the effect of the different wiring lengths. Additionally, since the device of Tanaka et al. relates to a printing apparatus for printing a video signal, and not to a display for displaying an image signal, there are no data driving parts discussed in Tanaka et al.

Thus, there are also no portions of the data driving parts at different positions (with different wiring lengths) discussed in Tanaka et al. either. Further, although Figure 6 of Tanaka et al. broadly shows a display device 50, the reference does not mention that display device 50 could be a liquid crystal display. Accordingly, as all of the features of independent Claims 1 and 9 are not disclosed or suggested in the cited references, Applicants respectfully request the withdrawal of this §103 rejection of independent Claims 1 and 9 and associated dependent Claims 2-5, 10 and 11.

For all of the above reasons, Applicants request reconsideration and allowance of the claimed invention. Should the Examiner be of the opinion that a telephone conference would aid in the prosecution of the application, or that outstanding issues exist, the Examiner is invited to contact the undersigned.

Respectfully submitted,

GREER, BURNS & CRAIN, LTD.

By 

James K. Folker

Registration No. 37,538

October 11, 2006

Suite 2500
300 South Wacker Drive
Chicago, Illinois 60606
(312) 360-0080

Customer No. 24978

P:\DOCS\0941\66047\AR7893.DOC